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Kansas always has been and always will be essentially a prairie state. But every year brings more convincing proof that her plains need not always remain treeless. Each planting season sees new effort put forth to beautify the Western Kansas homes and divest the plains of their traditional bleakness.

The state possesses a wide range of climatological conditions and physiographic features. In passing from east to west one notes a gradation from the wooded stream banks and timber belts of the eastern sections to the wide flat plains of the extreme west and southwest, where a tree becomes a novelty. The climatic conditions change from those of the average Mississippi Valley state to those of the plains regions. The rainfall drops from an average of 35 to 37 inches to an average of about 16 inches. The winds rise gradually until in the western section velocities of 20 miles per hour are very common and those of 35 to 40 miles are frequent. The lack of protective belts and the dry prairie soils increase their drying effects and enable them to carry the soils more and more, until in the western parts of the state soil blowing becomes a serious problem. The precipitation is likely to come more or less spasmodically, being heavy during the winter and spring of the year and little or none during the summer months. Hail is frequent and often does a great damage by defoliating and even barking old as well as young trees. Winterkilling becomes important, not because of the low temperatures, but because of the late fall and early spring warm spells. These sometimes occur as late as December and as early as February. Often sap will begin to rise. Nearly always such warm spells are followed by cold waves and freezing weather. Winterkilling is the usual result. Such conditions increase the vicissitudes and limit the scope of the tree planter's work. They make hardy species and intensive methods of moisture conservation imperative.

However, to those who really know the state it is not as wild and barren as popular opinion would have it, and there are evidences of earlier days which hold forth promise of a certain amount of success in tree planting for the future. It is probable that the Kansas plains were not always as destitute of trees as they are at present. For example, on the Fort Hays Experiment Station, which in the early days was the Fort Hays Military Reservation, a belt of heavy timber borders Big Creek as far as the reservation extended. Beyond these limits the timber breaks off suddenly

The type of Kansas home which the present generation is rapidly beautifying by tree and shrub planting.

A view in the timber belt bordering Big Creek, on the Fort Hays Experiment Station, Hays, Kan., formerly the Fort Hays Military Reservation. The above shows Custer's Island, where George A. Custer and party were surrounded by Indians, later marooned by high water and finally forced to swim their horses out to escape.

A Catalpa speciosa plantation on bottom land in western Kansas. Plantation is 3½ years old, rows 3 feet apart. Catalpa is hardy on bottom land but grows scraggly on upland.

A typical sod house of the pioneer day. Such remnants are scattered throughout the western sections of the state and give evidence of the early scarcity of timber.

and is then noticeable only in irregular blocks along the stream. Evidence of single specimens or small groups of very old mature timber along other creek bottoms and along draws throughout the Western section seem to point further to a day when these lower areas and stream banks all may have been more extensively wooded. Many instances are found, too, where tree growth breaks off in a sharp line just beyond some stream or other natural barrier. It is not at all improbable that these are the results of destruction by fire. The Indian of the early days fired the prairies to destroy pasture and game against the approach of his unfriendly neighbors, and in so doing he was not scrupulous about encroaching upon any timber land which might have existed. The great prairie fires which have become more or less history, regardless of their origin, undoubtedly decreased any existing timber areas. Then, too, the early settler demanded fuel and structural timber. Just how far-reaching such destruction was is difficult to say in view of the remaining remnants of the old sod house and of the reports of the great distances to which lumber was carried overland. However, it is reasonably safe to suppose that inroads were made on any native timber then standing.

Nevertheless, trees were then, as now, "conspicuous by their absence" in Western Kansas, and the second generation of settlers especially, who were not compelled to spend every spare minute to win a bare existence from the soil began to demand trees of some kind. The earliest efforts at tree culture were made in the form of the old "tree claim." Spotted all through the western sections of Kansas may be found remnants of these plantings in varying stages of preservation. They do not exhibit magnificent trees, but they give promise of better results with more intensive methods. In nearly every case the plantings have become scraggly and deteriorated, mostly because of neglect and very often because of poor varieties. Land was the object of the plantings, not trees. As a result they were set and left to their own salvation in the battle against the hardships of the soil and the prairie sod.

The present generation, however, are no longer land seekers; they have become land-owners and home-builders. Now comes a new demand for trees to make Kansas homes more livable. Through this second demand or awakening has come more systematic effort, and gradually the people are beginning to realize that tree planting is not an impossibility, that it is a necessity, that it will pay in some form or other sooner or later. It was to further these efforts that a State Forestry Department was established with a State Forester at its head. Two state nurseries are now maintained, one in the Eastern and one in the Western section of the state. The stock is distributed to the people of Kansas at the cost of production. Kansas has again been brought

to face the tree planting problem; but they are being attacked in a new light.

It is perhaps safe to say that the maintaining of a nursery in Western Kansas is one of the greatest stimuli to tree planting. A commercial nursery in this section at the present stage would undoubtedly "go broke." The state is about the only institution which can afford to handle such a proposition for the sole purpose of "furthering the cause." The results that are being obtained justify the maintenance of the institution. Through the Western Nursery, located at the Fort Hays Experiment Station, Hays, Kansas, the source of supply is placed much nearer to the purchaser and furnishes planting stock at a season which is comparable to the planting season in this section of the state. While it may seem a small item to say that many people are induced to plant trees through visiting the Forest Nursery and through simply feeling that the stock is near at hand, in reality this influence is surprisingly large. The majority of the trees shipped from the Hays Nursery go to the Western part of the state, and the "yard business" is nearly as large as the mail order business. A large number of the Western Kansas farmers have only moderate incomes, and they look at the increased freight and express charges for long distances a long time.

Then, it is important that the stock be ready to plant when the time comes to plant it. The planting season is apt to be short, early or late. Where the stock is raised under the conditions of the region it keeps pace with the season so that it lies dormant or begins to grow according to local conditions. This is apt to cause less delay if the season is early or furnish stock which is not too far advanced if the season is late. This factor is not important where the seasons change steadily, but where there are such fluctuations as in Western Kansas it has an important influence. Also, if hardy varieties are to be found and raised they must be tested under conditions prevailing.

In spite of all the need for trees, the Forester still has problems to overcome in furthering the tree planting movement. He has to bring the people to adapt their ideas of tree growth to existing conditions. A large part of the population has come from sections of the world where trees have grown in abundance and with little or no care. Kansas was treeless when they arrived; it surely was supposed to remain so, in their judgment. Popular belief has said, "Trees cannot be raised in Kansas," and this has settled all debates for many. The early efforts in the form of the old "tree claim" were a failure. To others this is conclusive proof. Regardless of the results of plantings in older towns and the specimens that exist where care has been given, it is hard to convince the "old timer" that he can afford to plant a tree. Such convictions have their foundation, it is true. A season such as 1915 with a total of 34.14 inches rainfall

Shelter belt planted in 1905 and 1906.

Same shelter belt from opposite side seven years later.

A view of the park maintained by the Fort Hays Experiment Station at Hays, Kan. The above was taken in 1912, seven years after planting. Cultivation maintained throughout.

A hackberry plantation in western Kansas, three years old. Rows are four feet apart. A hardy variety for this section.

well distributed throughout the year adds enthusiasm to the tree planting movement; but one like the past season of 1916, with only 16.01 inches rainfall and only 5.3 inches of this amount after June first, is exactly the opposite and requires a great amount of optimism and persistence. Trees 12 and 15 years old which have been thrifty, well established and well cared for have died in the one season. Then further, the idea that the trees raised are not worth raising puts out of the running many who have become accustomed to the tall stately tree of the timber regions from which they came. It is hard to convince them that the low topped, bushy growth is best adapted and is really a tree; that it must serve at least as the forerunner of the more stately type. Such are the prejudices which must be overcome.

Winds are perhaps as limiting a factor to tree growth as any other. There is no question as to their effect upon tree forms and plant life. A tree grown in the open is almost certain to become one sided, and even when grown where partially protected shows the one sided effect distinctly. Besides, the winds during the growing season, of a dry year especially, are hot and drying and evaporation is extreme. For these reasons the low headed bushy tree is the best type adapted to the region. The success of the tree planting movement, therefore, depends largely upon the development of wind and drought resistant varieties.

The greatest education needed is, as in any forestry movement, that of the care of the tree. If it is important to cultivate, water and care for tree plantings in more favorable climates, it is doubly important in the prairie state. Vegetation which does exists, exists because of its very ruggedness and ability to withstand hard usage. It will take a tree of the same type to battle against it, and there are few species which will do so without help. With help much can be accomplished. Species which have been found to withstand conditions best are: White elm, Norway Poplar, Honey Locust, Kentucky Coffee tree, Tamarix (shrub and hedgeplant), Osage orange, Russian Mulberry, Russian Olive, Redbud, Cottonwood, Hackberry, Chinese Arborvitae, Red Cedar (*Juniperus Virginiania*) Austrian pine and Yellow pine.

The best trees are those which have been longest cared for. A public park maintained by the Fort Hays Experiment Station, which has been planted between 10 and 12 years, has been kept under thorough cultivation. The trees have made a remarkable growth and now stand as excellent examples of what can be accomplished with care. Another plantation of Catalpa (*Catalpa speciosa*), now 11 years old, has produced between 250 and 300 fence posts on 1½ acres, the posts averaging about 4 inches top diameter. While such may be only scattering exam-

ples, they show what can be accomplished with a certain amount of effort.

The tree planting movement will gain in proportions as the people learn the possibilities and realize the effort needed. The percentage of loss is greater than in more favorable climates, hence, the effort must be proportionately increased. But the value of the surviving per cent is so much greater in comparison that it should be looked upon as well worth the added effort. As the people realize this more and more they are increasing their interest and persistence.

The State Nursery at Hays is maintained in connection with the Fort Hays Experiment Station. From a Nursery of approximately one acre 5 years ago and containing but a few trees it has grown to one of 25 acres and contains some 250,000 trees and plants of various ages and sizes. The demand for trees that the Nursury produces has grown in the same time from a few trees planted at the Station for demonstration purposes to one of approximately 75,000 trees, which represents the approximate number shipped to all parts of the State each year. Of the trees sent out the number reported living after the first season's growth has increased from 76% to 91%. Out of some 480 orders during the spring of 1916 only 12 went to points outside of the State.

Charts for each of the past five years showing points to which trees have been shipped from the Hays Nursery, show also that the Western sections of the State are receiving a larger proportion of the orders from the Nursery each year. With one exception, when there was a general decrease in the number of orders all over the state, the west has increased steadily while the east has fallen off. During the past year there was an increase in the two western sections of 37% and 146% respectively.

Thus, the desolate plains of Kansas are rapidly becoming farm homes, and the homes are being beautified. It will undoubtedly be a gradual process which gives the state any extensive timber belts, but the persistent efforts at shelter belt, shade tree, and shrubbery planting are bound to increase, and it is not unreasonable to dream of a day when the plains will be spotted with trees, marking the prosperous homesteads of the wheat farmers of the Sunflower State.